

SOME RECORDS OF PREDACEOUS *CERATOPOGONINAE* (DIPTERA).

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It has long been known that many of the species of the old genus *Ceratopogon* are predaceous on other insects. Staeger (1838) states that the females of all of them are predaceous, a statement which is far too sweeping, but shows that he must have made many observations on the point. Walker (1856), more cautiously, says that "the species whose femora are armed with spines make a prey of other small insects, which they pierce with their sharp proboscis." This remark, as will be shown below, errs rather on the side of moderation, as some species with unarmed femora are habitual predators.

In spite of this long-known propensity of these insects, it is a remarkable fact that practically no exact observations on the subject seem to have been placed on record. Many observers have devoted their attention to the prey of *Asilidae* and *Empididae*, but the almost equally interesting *Ceratopogoninae* have been ignored; the only record I have been able to trace being that of Malloch, who says (Bull. Illinois State Lab. Nat. Hist. x, 1914, p. 216) that he has observed in Britain a large species of *Palpomyia* feeding on a Perlid. There is also the case, dealt with below, of *Johannsenomyia nitida* feeding on its own male.

I propose now to record a few observations of my own on this subject, and hope that others may thereby be induced to pay attention to the matter. In almost all the cases recorded the insects were found on the roof of the "cottage" tent in which I usually sleep on my summer holidays, in the evening or early morning. The tent, like any other raised object, serves to provide a place for male *Chironomidae* to swarm, and in nearly all cases the prey consisted of members of these swarms, the predators being always females of bare-winged *Ceratopogoninae* belonging to various genera. The prey was seized in the air, and together with its captor fell on to the tent roof, where the pair were boxed. The preference of the *Ceratopogoninae* for males of other *Chironomidae*, which this method of collecting indicates, may not actually be so marked as appears, since other insects do not so readily swarm over the tent; I think, however, that it will be found to be the general rule. Although I have not experimented in this direction, it would seem very probable that much information on this subject could be obtained by throwing a white sheet over suitable low bushes above which Chironomids are swarming, and observing the insects which fall or settle on it.

In the notes which follow I have not included any of the published records of *Ceratopogoninae* sucking the blood of caterpillars or other insects. Knab, in a recent paper (1914), collected several American records of this nature, and the same thing has been reported more than once in Europe, though not as yet in Britain. It is a subject which will repay further investigation, though it does not come under the heading of predacity, since these flies do not seem to kill their victims. The flies which have this habit are generally, if not always, members of the genera *Forcipomyia* or *Dasyhelea*, and the victims are usually large smooth Lepidopterous larvae.

*Stilobezzia gracilis* Hal.—Preying on *Cricotopus pulchripes* Verr., ♂ (*Trichocladius montiragus* Goet.), Llyn Gwynant, Snowdon, 13.viii.1914. On *Tanytus binotatus* Mg., ♂, Dartmouth, vi.1920: numerous examples; also, in one case, on *Orthocladius* (*Dactylocladius*) sp. inc., ♂, at the same time and place. On the same *Orthocladius* and on two species of *Tanytarsus*, ♂, Snailbeach, Salop, vii.1920.

*Stilobezzia illustris* Winn.—Mr. Collin informs me that Mr. Hamm has taken a specimen of this species near Oxford in the clutches of a small Empid, so that these predaceous species are not without their enemies. I have never met with *S. illustris* myself.

*Serromyia femorata* F.—Preying on *Cricotopus pulchripes* Verr., Llyn Gwynant, Snowdon, 13.vii.1914. On *Bezzia ornata* Mg., ♂, Ffrith, Flintshire, 7.vi.1919. Also, in several instances, on the male of its own species, Dartmouth, vi.1920. The position of pairing is rather remarkable, the female carrying the male about beneath her, the ventral surfaces of the two insects in contact and the mouth-parts joined. After some time in this position, the female devours her partner, apparently sucking him dry through the mouth-opening. Very similar habits have been recorded by Staeger for a species he identified as *C. (Johannsenomyia) nitida* Mcq., but there is reason to doubt the correctness of his determination, as he refers to the "strongly armed front legs"; moreover, since the male of *J. nitida* is very much smaller than the female, it is not easy to see how they could occupy a position such as that described by him.

*Johannsenomyia nitida* (Mcq.).—Although, as just stated, it may be doubted whether Staeger's observations really applied to this species, there is a strong probability that the female of *J. nitida* devours its own male. Goetzhebnner has recorded (Ann. Soc. Ent. Belg. lviii, 1914, p. 1) finding many females of *J. nitida* with the genital organs of a male attached to the end of the abdomen.

*Psilohela candidata* (Winn.).—Preying on *Trichocladius* sp., ♂, Corriegills, Arran, vi.1919: two examples.

*Isohelea lacteipennis* (Zett.).—Preying on *Camptocladius* ? *gracilis* Goet., ♂ and ♀: many examples; also, in one or two cases, on the male of its own species, and in one case on *Culicoides arcuatus* (Winn.), ♂, Catacol, Arran, vi.1919. On *Camptocladius* sp., ♂, Gidleigh, S. Devon, vi.1920.

*Palpomyia flavipes* Mg.—On a May-fly (*Baëtis* sp.), Snailbeach, Salop, vii.1920. The May-fly was much larger than the *Palpomyia*. The latter settled on its back in the air and inserted its proboscis into one of the May-fly's eyes, through which it sucked. The victim was capable for some time of walking about with its enemy on its back, but had been sucked dry before morning.

*Palpomyia* ? *nigripes* Mg.—A specimen collected by Lt.-Col. Yerbury at Studland, Dorset, 2.vii.1907, was pinned on the same card with a female of *Tanyppus guttipennis* Wulp, probably indicating that it was feeding upon the *Tanyppus*.

*Probezzia* ? *signata* (Mg.).—On *Culicoides pulicaris* (L.), ♂, Dartmouth, vi.1920.

*Probezzia multiannulata* Strobl.—On *Culicoides* sp. n., ♂, Dartmouth, vi.1920.

*Bezzia annulipes* Mg.—On *Tanytarsus sylvaticus* Wulp, ♂, Radwell, Herts, vi.1918.

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*Hylastes attenuatus* Er. a British Insect.—Some years back I found here a specimen of a very small *Hylastes* on some white linen hung out to dry, and put it aside as probably a starved *H. angustatus*. On May 12th of this year I noticed a number of specimens of this genus, as well as other beetles, walking on the stump of a felled conifer, and some of these were so small that I took four of them, and as I had nothing to put them in with me, wrapped them in some paper, in which they got smashed before I reached home. On comparing the remains with *H. angustatus* I found sufficient difference to lead me to believe them to be a distinct species, and, on looking into the literature, I labelled them "*H. attenuatus* Er.?" As I was leaving home the next day I asked my daughter to go to the stump to look for more; she did so, and found two agreeing with the others. Commander Walker was here in the following month, and one day informed me that he had found several examples of a very small *Hylastes* walking on newly-sawn spruce-fir planks in the well-known timber-yard at Brockenhurst, as well as one found by sweeping under spruce trees at Rhinefield. He now tells me that he has submitted the specimens to Mr. Champion, who has confirmed them as *H. attenuatus* Er. I think, therefore, we may add that species to our British list. The genus is a difficult one, and *H. attenuatus* is treated as a variety of *angustatus* Herbst in the Heyden-Weise catalogue of European Coleoptera. It is, however, smaller than *angustatus*, especially narrower, and the punctures on the thorax are rather larger and less crowded, so that the surface is not so dull there; the setae on the elytra are longer and therefore more conspicuous. The stump on which my specimens were found here is of spruce-fir, but the species is probably not confined to that kind of conifer. Perris, who paid so much attention to the insects of *Pinus maritima*, records this species therefrom, as well as *H. angustatus* and another species which he described as *H. variolosus*. He found them at work in the Landes in the month of May, and considers it